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Applying Kansei engineering to industrial machinery trade show booth design

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ABSTRACT

Trade shows are considered an important marketing channel for companies since they provide manufacturers and purchasers with a vital commercial platform. Traditionally, plastics and rubber industry trade shows have been ineffective due to poor booth planning. Nevertheless, few studies have examined trade show booth design and planning. Actually, most companies lack distinct goals, and their decisions regarding trade show participation may influence decisions regarding which products should be demonstrated, size of trade booth, and level of advertising. Such a decision-making is a problem involving multi-criteria decisions, and requires a logical and objective operating procedure. This work thus devises an objective procedure for trade show. This investigation focuses on booth design for plastics and rubber industry trade shows and comprises three parts: (1) selecting appropriate assessment criteria for trade show design using the Delphi method and Kansei engineering. (2) Establishing suitable booth design principles and procedures for plastics and rubber industry trade show using fuzzy product positioning. (3) Further employing the proposed method to design trade show booths and verify their performance. The results demonstrate the feasibility of the proposed method.

Relevance to industry: This study was conducted to support machinery vendors as a systematic design flow chart and related criteria to provide an objective approach to trade show booth planning.

1. Introduction

Trade shows provide vendors and purchasers with a vital platform for commerce. Industrial machinery manufacturers consider trade shows important for promoting global marketing since they focus on marketing to specific customers. However, traditional machinery industry trade shows have been ineffective because of poor booth planning. Little research exists on trade show planning and design. Tanner and Chonko (1995) believed that trade shows provide customers with numerous crucial opportunities for contact and can enable business to be conducted faster. Tanner (2002) reported that trade shows basically provide resource of purchasing and channels for products to achieve market entry. Nevertheless, vendors have strong incentives to participate in trade shows. For example, numerous companies base their decisions of trade show participation on similar decisions made by their competitors. Gopalakrishna et al. (1995) observed that few companies have digitally analyzed their goals and methods with regard to trade show participation. Actually, most companies lack distinct goals, and their decisions regarding trade show participation depend on policy maker opinions. This situation influences decisions regarding which products should be demonstrated, size of trade booth, and level of advertising. Such a 'black box' decision is not suitable for application to trade show booth design which is a problem involving multi-criteria decisions, and requires a logical and objective operating procedure.

While examining plastics and rubber industry trade shows, this work presents a multiple criteria decision-making method for trade show design. The proposed method includes three parts: (1) choosing appropriate assessment criteria for trade show design using the Delphi method and Kansei engineering, (2) establishing appropriate principles and procedures for booth design for plastics and rubber industry trade shows using fuzzy product positioning, (3) providing an improved trade booth design to realize the goals of trade show participation.

2. Methodology

This investigation comprises three parts: (1) data collection and analysis – including gathering criteria for judging trade show design, listing the weightings of the objectives of trade show participation, selecting samples of good design from trade show booths, and creating image–word datum for trade show description. (2) Product positioning – including designing a decision-making

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Table 1
Image–word pairs of describing trade show booth design.

Category	Image–word pairs
Appearance	Modern–traditional
	Simple–complicated
	Professional–amateur
	Lively–boring
	Scientific–superstitious
	Unique–ubiquitous
Lighting	Bright–dark
	Harsh–soft
	Dazzling–dim
Functionality	Safe–dangerous
	Convenient–inconvenient
	Practical–ornamental
	Comfortable–uncomfortable
	Clean–dirty
	Durable–fragile

model, identifying the ideal booth design model, and capturing image–word datum for describing plastics and rubber machinery trade show. (3) Case study and verification – including developing new trade show booth designs and verifying its performance.

2.1. Part 1: Data collection and analysis

This part includes data collection and analysis. First, trade show booth design samples are obtained from the 2008 Taipei International Plastics & Rubber Industry Show, and nine experts are invited to select good trade show booth design samples. Using the Delphi method, these experts collaborate to generate assessment criteria for booth design and establish factors for weighting the goals of trade show participation. Second, this study employs category classification to create image–word datum for describing trade show design. The following introduces the Delphi method and category classification.

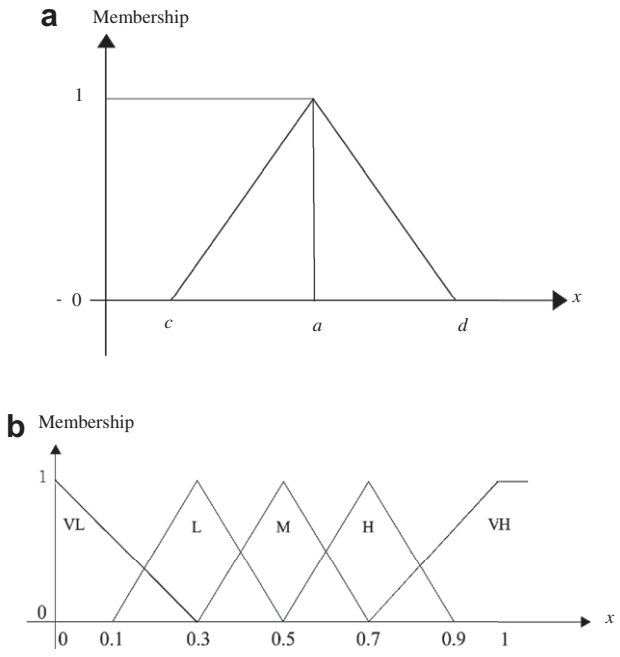
2.1.1. Delphi method

The Delphi method was proposed by Rand Corporation in 1976, and achieved efficient multi-opinion decision-making by avoiding predicted error and reducing face-to-face arguments (Dalkey and Helmer, 1963; Rescher, 1998). The Delphi method has become one of the most popular methods of decision-making in expert-organized groups. This investigation focuses on professional trade shows and requires expert opinions, and consequently adopts the Delphi method in decision-making. This study surveyed nine experts recruited from the machinery industry, design firms, and exhibition centers. These experts are expected to develop assessment criteria for trade show design, identify samples of good booth design, and verify new design cases.

Data used in sample selection by experts are based on 116 sets of booths chosen from the Taipei International Plastics & Rubber Industry Show in 2008. The first three highest scores are identified as examples of good booth design.

2.1.2. Category classification

Kansei engineering, a methodology for systematically exploring user perceptions about a product and translating these perceptions into design parameters (Nagamachi, 1995; Schutte and Eklund, 2003), has been applied when designing automobiles, construction machinery, electrical home appliances, office machines, and cosmetics (Jindo and Hirasago, 1997; Nakada, 1997; Nagamachi, 2002; Mondragón et al., 2005; Demirtas et al., 2009). The most important task in Kansei engineering is to survey customers to identify their preferences, or Kansei, at the start of the product development process. The category classification is a method in which a Kansei category of a product is broken down in the tree structure to get the design details. It is used in this study to convert a verbal product description into a detailed design. Surveying the literature identifies 342 image–word pairs used in design description (Shen, 2004; Wang, 2003; Tseng, 2003). Based on this image–word data, experts choose appropriate adjectives to describe trade show design. Adjectives for describing trade show booth design are identified if over half the experts agree the description. Table 1 lists the results, and the image–word pairs are classified as applying to appearance, lighting, and functionality. Clarifying the referent in all cases include 'modern–traditional', 'simple–complicated', 'professional–amateur', 'lively–boring', 'scientific–superstitious', and 'unique–ubiquitous' as descriptors of appearance; 'bright–dark', 'harsh–soft', and 'dazzling–dim' as descriptors of lighting; 'safe–dangerous', 'convenient–inconvenient', 'practical–ornamental', 'comfortable–uncomfortable', 'clean–dirty', and 'durable–fragile' as descriptors of functionality.



Linguistic data	Triangular fuzzy number
Very Low-level satisfaction (VL)	(0.0, 0.0, 0.3)
Low-level satisfaction (L)	(0.1, 0.3, 0.5)
Medium-level satisfication (M)	(0.3, 0.5, 0.7)
High-level satisfication (H)	(0.5, 0.7, 0.9)
Very High-level satisfication (VH)	(0.7, 1.0, 1.0)

Fig. 1. Definition of the membership function: (a) membership function; (b) linguistic set.

Table 2
Goals of trade show participation.

Sequence	Goals
1	Increase brand visibility
2	Attract potential customers
3	Strengthen enterprise image
4	Promote new products
5	Obtain new order
6	Create leading position
7	Touch customs
8	Test market response of new products
9	Gather market information